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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,680	02/13/2004	Nobuyuki Eto	Q79867	5870

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EXAMINER	
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ART UNIT	PAPER NUMBER
1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/777,680	ETO ET AL.	
	Examiner	Art Unit	
	JASON L. LAZORCIK	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 17, 2009 has been entered.

Status of the Claims

2. Applicant's amendment after final dated January 15, 2009 amended independent claim 1 and Applicant's Reply dated February 17, 2009 added new claim 8. All other claims stand as presented in Applicants reply dated May 1, 2008.

3. Claim 5 has been cancelled by Applicant.

4. Claims 1-4 and 6-8 are pending for prosecution on the merits

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. **Claims 1-4 and 6-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.** The claim(s) contains subject matter which was not described in the specification in such a way as to

reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

7. Regarding the amended claim 1, Applicant was previously cautioned in the Advisory Action dated January 29, 2009 that the Specification as originally filed lacks support for a glass substrate which "contains lithium ions and no tin" as recited in line 12 of claim 1. Specifically, Applicant was advised that although the Specification reasonably provides supporting basis for the recited limitation wherein the glass substrate cont that lithium ions (see Specification, page 6, paragraph 3), the Specification has been found to lack supporting basis for the limitation which explicitly excludes tin from the substrate composition.

8. The mere observation that Applicants preferred embodiments do not report a tin content does not by itself provide supporting basis for the instant negative limitation which explicitly excludes tin from the substrate. It is therefore the Examiner's conclusion that the claimed subject matter was not conveyed in such a manner as to demonstrate that Applicant was in possession of the claimed invention at the time the application was filed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Aratani (US 4,671,814).

Aratani teaches a method for strengthening a glass substrate having a thickness of about 1.0mm by chemical strengthening. As set forth in Example 1 (Column 8, Lines 39-53), the immediate reference teaches that,

> "The sample disks were immersed in a bath of molten sodium nitrate…The sample disks taken up from the bath were left to cool down and were washed with water to remove adherent sodium nitrate and dried.
>
> After the above treatment with sodium nitrate, all the sample disks were immersed in a bath of molten potassium nitrate….The samples taken up from the molten potassium were left to cool down, washed and dried."

The Aratani disclosure clearly sets forth a two step process wherein a glass substrate is process with a first alkali ion of a first molten salt containing sodium nitrate and followed with a subsequent treatment using a second alkali ion of a second molten salt containing potassium nitrate. Applicant is advised that the claimed effect upon compressive stress at the surface of the substrate and tensile stress at an interior depth of the substrate are understood implicitly to follow from the disclosed process.

Regarding the composition of the glass substrate, Aratani states that the chemical composition of the glass for use in the present invention "is not particularly limited and may belong to soda-lime-silicate glass, boro-silicate glass or alumino-silicate glass, or to a still different type of glass" (Col. 5, lines 27-32). Aratani later explicitly teaches that it is preferable to utilize "a lithium salt when the principal alkali metal in the glass composition is lithium" and that "it is also possible to use a mixture of a sodium salt or sodium salts and a lithium salt or lithium salts". Applicant will appreciate from the

foregoing that Aratani explicitly contemplated the application of the instant process to a variety of glass compositions including compositions which “contain lithium ions” as recited in claim 8, line 12.

With respect to the Examiner's position on the residual stress profile set forth above, the Examiner offers the following rationale. Applicant is advised that the following discussion is offered solely to clarify the basis of the rejection set forth in the Office Action dated November 1, 2007. :

Applicant acknowledges that the Aratani process will increase the compressive stress at the surface of the glass sheet. Further with reference to Applicants presented figure 3, it is the Examiners position that the tensile stress through at a given depth of the glass sheet will be reduced in the manner claimed when the chemical strengthening is carried out according to the Aratani process.

That is, ion exchange and stress buildup in chemical tempering operations is well accepted to proceed in accordance with Fick’s law of diffusion. According to Fick's law, the ionic concentration at a given depth increases as a function of time, and this increasing ionic concentration results in the noted increasing surface compressive stress. This increasing ionic concentration at a depth of the glass substrate likewise alters the stress profile at the depth, influencing the change over from compressive stress to tensile stress. In effect, the point at which the stress profile crosses over from

compressive stress to tensile stress is pushed farther into the interior or the depth of the glass sheet with longer exposure to the molten ion exchange bath.

It follows that, since the Aratani second chemical strengthening step leads to an increased ion concentration at depth (by solid state diffusion) and thereby to an increased surface compressive stress, which was admitted by Applicant, this second strengthening step necessarily pushes the stress cross over point deeper into the glass substrate. Since the crossover, representing the break even point between net compressive and net tensile stress, is pushed further into the depth of the glass substrate with temporal ionic diffusion, the tensile stress experienced at a given depth of glass is necessarily reduced and eventually placed into compressive stress as this cross over point passes said depth.

To summarize, the increasing surface compressive stress caused by ion diffusion into the glass substrate is accompanied by a crossover point which proceeds further into the depth of the substrate with increasing treatment time. Absent any compelling evidence to the contrary, it is the Examiner's position that such a changing stress profile is inherently and necessarily accompanied by a reduction in the tensile stress of the depth of the glass substrate as claimed, when the chemical strengthening is carried out according to the Aratani disclosed process.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (US 6,119,483) in view of Aratani (US 4,671,814). Briefly, Takahashi teaches a method for processing a glass substrate for use as a magnetic disk.

With respect to Claim 8, Takahashi teaches that the glass substrate used for manufacturing a magnetic disk, after completion of grinding, polishing, and washing steps is subjected to a chemical reinforcement step. According to this process, " the glass substrate which had been washed was heated in advance to 300^{o}C, and immersed for about 3 hours in a chemical reinforcement solution preliminarily heated to 400^{o}C, said solution having been prepared by mixing potassium nitrate (60%) and sodium nitrate (40%)". Further, the reference indicates that "When the glass substrate is immersed in the chemical reinforcement solution, lithium ions and sodium ions on the

surface layer of the glass substrate are substituted by sodium ions and potassium ions in the chemical reinforcement solution, respectively, whereby the glass substrate is reinforced" (Column 10, Lines 50-67).

The immediate disclosure is understood to provide a method for processing a glass substrate for a magnetic disk wherein the glass substrate contains alkali ions (lithium and sodium ions) on the surface layer of the glass substrate. The process using a first alkali ion (sodium) present as a molten salt of sodium nitrate and having a first ion radius greater than the smallest ion radius of the smallest alkali ion (lithium) among the alkali ions contained in the glass substrate. The process further uses a second alkali ion (potassium) present as a molten salt of potassium nitrate for supplying the second alkali ion.

The immediate reference teaches that an aluminosilicate glass to be used for chemical reinforcement contains as principle components 57 to 74% SiO_2, 3 to 15% of Al_2O_3, 7 to 16% of Li_2O and 4 to 14% of Na_2O, each in terms of mole percent (Column 9, Lines 25-31). The reference continues with a preferred example of ~67% SiO_2, ~1% ZnO_2, ~9%Al_2O_3, ~12%Li_2O and ~10%Na_2O, each in terms of mole %. The cited example composition for the aluminosilicate glass reads directly upon the claimed concentration ranges for each constituent.

Takahashi indicates that "the magnetic disk is produced by forming a thin film such as a magnetic layer on a substrate and as the substrate for it,…(a) glass substrate has been employed" (Column 1, Lines 21-23)

(I) Takahashi is silent regarding the two stage treatment process

Takahashi teaches that the treatment process as indicated above proceeds by a single dip in a molten solution or mixture of potassium nitrate (60%) and sodium nitrate (40%).

As such Takahashi fails to explicitly set forth a scenario wherein the processing of the glass substrate is effected by the use of a first ion alkali ion and ***subsequently*** processing the substrate by the use of a second alkali ion. It is here understood that the disclosed immersion in a molten mixture or solution of the two alkali ions does not anticipate the claimed process indicating a first process step and a ***subsequent*** second step.

(II) The recited two stage treatment would have been obvious over Takahashi in view of the Aratani disclosure

Aratani teaches a method for strengthening a glass substrate having a thickness of about 1.0mm by chemical strengthening. As set forth in Example 1 (Column 8, Lines 39-53), the immediate reference teaches that,

> "The sample disks were immersed in a bath of molten sodium nitrate…The sample disks taken up from the bath were left to cool down and were washed with water to remove adherent sodium nitrate and dried.

> After the above treatment with sodium nitrate, all the sample disks were immersed in a bath of molten potassium nitrate….The samples taken up from the molten potassium were left to cool down, washed and dried."

The Aratani disclosure clearly sets forth a two step process wherein a glass substrate is process with a first alkali ion of a first molten salt containing sodium nitrate and followed with a subsequent treatment using a second alkali ion of a second molten salt containing potassium nitrate. Aratani teaches that thin float glass substrates tend to severely warp during chemical tempering or strengthening and that "the principle cause of such warping is presumed to be diffusion of tin, or an alternate metal, used as the molten metal in the float process into the glass surface which is in contact with the surface of the molten metal bath" (column 1, Lines61-68). The reference further indicates that the two step treatment "is remarkably effective for suppression of warping of float glass by ion exchange strengthening treatment" (Column 3, Lines 16-47).

Since the Aratani process utilizes substantially the same materials as Applicants disclosed invention in a substantially identical process, said two step process is implicitly understood to first "produce compression stress on a surface of the glass substrate and to produce tensile stress in a depth of the glass substrate" and second to "increase the compression stress of the surface of the glass substrate and to reduce the tensile stress of the depth of the glass substrate" as claimed.

In view of the Aratani disclosure, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the single mixture (60% potassium nitrate/40% sodium nitrate) chemical strengthening process set forth by Takahashi with the two step process as taught by Aratani. This modification would have been obvious to one of ordinary skill seeking to minimize the degree and severity of warping in a planar float glass substrate incurred during the chemically strengthening process.

Response to Arguments

9. Applicant's arguments filed February 17, 2009 have been fully considered but they are not persuasive.

10. Specifically, Applicant alleges that “there can be no question that the disclosure of the present application includes a variety of glass compositions for a glass substrate for a magnetic disk, but that NONE of those compositions has tin”. Applicant thereby concludes that “this alone is a basis for supporting the negative limitation “and not tin” in claim 1” and that the originally filed Specification provides sufficient support for the claim language.

11. The Examiner strongly disagrees.

12. The Examiner is in agreement with the Applicant regarding the statement that the originally filed Specification provides for a variety of glass compositions. However, the Examiner strongly disagrees with Applicants premise such that "NONE of those compositions has tin".

13. To the contrary, not one of the disclosed compositions or compositional ranges provides any insight at all into the tin content of the glass. The mere observation that none of the disclosed compositions report a tin content is in no manner equivalent to the recited limitation which explicitly excludes tin from the glass composition. That is, the exclusion of tin from the disclosed glass composition is nowhere explicitly stated in the originally filed Specification nor is it inherently a property of the glass compositions. It follows that Applicant's originally filed Specification did not provide support for the instant limitation at the time the application was filed and the instant limitation is appropriately construed as new matter.

14. Although not central to the Examiner's conclusions as set forth above, the Examiner respectfully acknowledges Applicant's allegations such that the Aratani glass develops a tin containing surface layer because it is manufactured by the float glass process and not, *per se*, because of an intentional incorporation of tin into the base glass composition. Turning now to Applicant's disclosed process, it is noted that Applicant provides no indication at all regarding the type of glass manufacturing process used to prepare the glass substrates in the instant application. Since Applicant asserts that the Aratani substrate develops a tin layer by virtue of its fabrication by the float glass manufacturing process and since Applicant further asserts that the substrates of the instant application have no tin, Applicant is therefore apparently asserting that the glass for the process of the instant application is necessarily not produced by the float glass method. Here again, since Applicant has provided no direction regarding the

method of manufacture of the glass substrate, Applicant has no basis to exclude glasses fabricated by the float glass method.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The United States patent to Koyama et. al. (US 6,413,892) explicitly teaches a glass substrate for magnetic recording media which comprises lithium ions and no tin ions (see abstract) and which is particularly desirable for the manufacture of flat substrates by the float process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. LAZORCIK whose telephone number is (571)272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. L. L./
Examiner, Art Unit 1791

/Eric Hug/
Primary Examiner, Art Unit 1791